

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 1

Music begins and fades slightly

Will - Hi, I'm Ranger Will Elder, and welcome to Golden Gate Climate Update, your source for information on climate change and sustainability. Join us as we hear from people helping your National Parks understand and adapt to climate change.

Today we are talking with Dr. Patrick Barnard, research geologist with United States Geological Survey coastal and marine geology program. So Patrick, can you briefly tell us about the coastal erosion studies you are conducting and the climate change factors that may be affecting erosion rates along the California coast?

Patrick - Well, we do monitoring in several different regions. One, the one that's most relevant to the Park Service sort of mission of late, is in GGNRA at Ocean Beach, where we've been measuring the beach topography there for six years now on a monthly basis, sometimes even more often during the winter in response to storms. In terms of climate change, we are trying to develop a long-term data set that we can then start to pick up on some of these impacts that are going to take a longer time to resolve, that being things like climate change and sea level rise. And right now, we're at about six years at Ocean Beach and I think we're just starting to get into that area where we might be able to start looking at climate change and sea level impacts.

Will - And when you say climate change impacts, certainly sea level is rising – what other climate change factors may be affecting erosion rates?

Patrick - Well sea level rise, I'd say, in the short term is a fairly minor one in terms of the whole, underneath the climate change umbrella. You know, it's about two to three millimeters a year, so maybe we've seen, you know, a few centimeters while we've been studying Ocean Beach over the last six years or so at the most. Probably more relevant to the California coast over the short term is the trend of increased storminess. There's been a general increase in the frequency and size of winter storm waves that impact most of the West Coast north of Point Conception – as you go further north, the impact becomes more pronounced. For example, up off Puget Sound coast, the largest waves each winter have increased two and a half meters over the last twenty years or so, so

when you think about a few centimeters of sea level rise, it's sort of dwarfed by this increase in storminess.

Will - Okay. So now, you're work on Ocean Beach – you've been monitoring erosion there for awhile. Is that in any way be related to climate change?

Patrick - It could be a component – the most relevant factor there seems to be a significant decrease in the sediment supply to the outer coast due primarily to anthropogenic influences and also probably due to a lot of sediment removal from San Francisco Bay over the last century due to dredging and mining. That being said, the directionality of waves is extremely important along Ocean Beach, and one of the studies we've been conducting is just the importance of wave direction, which will certainly change as climate continues to change. It seems to be the flux of sediment along Ocean Beach is highly sensitive to the direction of waves, and the more northerly the waves, the more protected Ocean Beach is. But we expect to see more waves out of the west and southwest as the ocean warms, and that tends to cause increased erosion at Ocean Beach.

Will - In fact, they're actually starting to armor the south end of Ocean Beach now to protect the infrastructure there. What are the benefits and dangers of armoring shorelines like that?

Patrick - Well, at Ocean Beach the armoring is within the tidal zone, and that tends to increase scour at the base of the seawall and erode the beach. So the benefit of that is the armoring will protect infrastructure, but the downside is that the beach will probably be eroded away much faster than if there was no armoring there at all.

Will - Before we move on to our next question, it's time for the climate update challenge. MIT climatologists state hurricanes have increased in both duration and intensity. What is the percentage increase? 50%? 18%? 27%? Hear the answer, and the second half of this interview, in part two. 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.