

**Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.**

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**El Niño-Be Careful What You Wish For**



*1983 damage to homes on Via Gaviota, Aptos Seascape.*



*1983 collapse of home onto beach along Beach Drive, Rio Del Mar.*



*1983 El Nino damage to beach level homes on Beach Drive, Rio Del Mar.*



*House on Beach Drive, Rio Del Mar, destroyed in 1983 El Nino.*

I've never heard so many people wishing for a potential disaster as I have over the past month or two as the probability of an El Niño this winter continues to remain very high. It's all quite understandable, simply because everyone living in California sees the pending El Niño as a drought buster, which isn't at all certain.

There's something almost daily in the news on the progress of this hoped for event, and no shortage of opinions and predictions. There's a timely quote here, variously attributed to Mark Twain, Yogi Berra and a host of others, but which has its origin in the Danish Parliament in the 1930s- "*Predictions are difficult, especially about the future.*"

There have been three large El Niños in recent decades, 1978, 1982-83 and 1997-98, and all of them smacked the Santa Cruz coast in ways that many might not remember, and few would like to see repeated.

It's been said that climate is what you predict and weather is what you get. Actually, climate is large scale and long-term, while weather is the day-to-day conditions and variations we experience. We have a Mediterranean climate, with the adjacent ocean serving as a buffer or climate moderator, so we're not usually nearly as warm or cold as our inland neighbors.

Yet, despite our moderate climate, we still get extremes, 101 last weekend. The hottest day ever recorded in Santa Cruz was August 1, 1900 when the thermometer hit 108 degrees. But the warmest continuous weather occurred in late-June 1976, in the middle of another drought. On June 23, the temperature hit 100 degrees, and for the next 6 days, maximums were 106, 105, 103, 105, and 103. This isn't typical or normal, but it might be more common in the future.

Climate isn't completely random but does follow some repeating patterns, and this brings us back to the possible impacts of an El Niño. The overall climate over the Pacific Ocean oscillates between two different modes, known as Pacific Decadal Oscillations (or PDO), with each typically lasting 20-30 years. During a cool phase, ocean temperatures are lower than normal, and the coast of California is characterized by below average rainfall, fewer larger storms and less wave damage along the shoreline. Conditions realtors like.

During a warm PDO phase, water temperatures are higher, evaporation rates increase, which tend to produce higher rainfalls, more flooding and landslides, an elevated sea surface, and storms with large waves, often from the west and southwest. El Niño events tend to be more frequent and larger during a warm phase of the PDO, which we just entered.

After about 20 years of moderate weather along the central coast, we were rudely awakened with the winter 1978 arrival of the first major El Niño in decades, which pummeled the California coast. Low-lying areas like the Esplanade in Capitola, Pot

Belly Beach, Seacliff State Beach, and Beach Drive in Rio Del Mar were hammered with a combination of elevated sea levels, high tides and large storm waves that arrived from the west and southwest, hitting the normally protected shoreline of northern Monterey Bay. Beaches were eroded and waves then started in on foundations, decks and stairs. We had transitioned to a warmer PDO cycle with all of its accompanying baggage. Total coastal damage in California from this event was \$65 million (in 2014 dollars).

Five years later, the memorable El Niño of 1982-83 hit, which was the most damaging to the California coast in half a century. Much of the newly reconstructed timber seawall at Seacliff State Beach was destroyed (for the 8<sup>th</sup> time), waves washed into the Venetian Court and the restaurants on the Esplanade in Capitola, and homes along Beach Drive in Rio Del Mar suffered major damage as seawalls were destroyed, sand levels dropped and some houses collapsed onto the beach. At Aptos Seascape, the protective rock revetment was overtopped and the storm waves went through the sliding glass doors into living rooms and kitchens. Oceanfront houses at Pajaro Dunes were threatened as 40 feet of dune was eroded almost overnight, leading to the emergency placement of 1000's of tons of rock. The 1982-83 El Niño damage in California reached \$240 million (in 2014 dollars).

No question we need water, but based on past El Niños, odds are only about 50:50 of a wet winter in central California.