

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

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Winter Waves and Moving Sand



The dredge in the harbor entrance.

This has been a great winter for surfers, but it's not been much fun for the dredge crew at the Santa Cruz harbor who have been trying to keep the entrance open, or not so great for anyone with a boat in the harbor. It's been even more frustrating for the crab fishermen, who not only haven't had safe crabs to go after, but couldn't have gotten out of the harbor for much of this month even if they would have been able to set their traps.

Dredging the harbor entrance is an endless and thankless task, but we really don't have much choice if want to maintain the harbor. Sand began to fill the entrance channel while it was still under construction over 50 years ago. It's not because of the design of the harbor, however, it's because of where it was built.

There are about 250,000 – 300,000 yds³ of sand moving down the coast and into Monterey Bay, and one way or another it has to get around the harbor. Over the past 20 years, the dredge has been sucking up about 260,000 yds³ of sand on

average every year, and pumping it out onto Twin Lakes Beach, where it continues its journey down coast.

If you were put all that sand in your average dump truck, it would fill about 22,000 of them. That's a truck driving along Seabright beach past the harbor every 24 minutes, 24 hours a day, and 365 days a year.

To get a better perspective on the amount of sand the dredge has to move every year, take a football field, from goal post to goal post, and pile sand 122 feet high over the entire field. That's about the height of a 10-story building- in short it's a lot of sand to vacuum out every year. It's made more difficult by large waves, changing tides, and with sand coming in at times this winter as fast as you can suck it up.

After being pumped out of the harbor, carried across Twin Lakes Beach, past Opal Cliffs and Capitola, all that sand then moves into the inner bay. It's carried along the shoreline of New Brighton, Seacliff, Seascape, Manresa and Sunset beaches. At the end of its shoreline journey, some of it having been transported from as far north as Devil's Slide, 90 miles upcoast, all that sand flows into the head of Monterey Submarine Canyon and then down to the deep-sea floor, never to be seen again.

While the average volume of sand dredged each year is about 260,000 yds³, it has ranged over the past 15 years from roughly 160,000 to 457,000 yds³. These are big annual variations, but they aren't related directly to rainfall, but rather to year-to-year differences in the wave climate, specifically the wave energy and the direction of wave approach.

El Niño years usually bring more frequent storms, which tend to come from more westerly or southwesterly directions, and also larger than normal waves, which move a lot of sand around.