Our Ocean Backyard

Column No. 319

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Changes at Capitola

If we are careful observers, or happen to look at old photographs, we may notice how the Santa Cruz coast has changed over time. In the attached aerial photograph of Depot Hill in Capitola from 1966 you may see a coastline that looks different in several ways from today.

This is a test for you locals or readers with historic interests, or really anyone from Capitola or Santa Cruz. How many things can you notice in this photograph that have changed in the intervening 54 years?

Perhaps the greatest difference you will notice is that there is virtually no Capitola beach in this photograph. A major event occurred upcoast at Santa Cruz just before this photograph was taken. In the column from two weeks ago, which included the photograph of Castle (Seabright) Beach, there was only a very narrow beach with most of the beach visitors concentrated in the little cove across East Cliff from the Natural History Museum. But with the construction of the west jetty of the Santa Cruz Small Craft Harbor in 1963, littoral drift of sand from the north was obstructed and impounded and Castle (now Seabright) Beach widened by hundreds of feet.

A small summer beach had always existed at Capitola, but with the sand moving downcoast trapped by the harbor jetty, Capitola’s sand supply was cut off, at least temporarily. The beach narrowed and then essentially disappeared. Because so much of this small village’s economy depended on the beach and summer visitors, they needed to find a way to restore their beach.

The solution in 1969 was to build a rock groin nearly 300 feet long at the south end of the Esplanade, and then bring in about 2,000 truckloads of local quarry sand to rebuild the beach. This created a permanent summer beach and brought back the summer visitors. Severe winter storms are a different matter, however, and during major El Niños, such as 1982-83 or 1997-98, or extreme high tides, the beach washes away and waves may overtop the low seawall and bring sand and debris onto the Esplanade.

As soon as the Santa Cruz Harbor jetties were completed, sand began to enter the harbor entrance and dredging was required to maintain adequate water depth for boats. The dredging has now been an annual need since 1965, and in recent years, about 250,000 cubic yards of sand is removed every year on average and placed on Twin Lakes Beach. Littoral drift driven by the dominant waves from the northwest carries this sand downcoast where it nourishes Capitola Beach. In the years since harbor construction, over 10 million cubic yards of sand, or a million dump truck loads have been dredged from the channel entrance and discharged onto Twin Lakes Beach.

An additional change you may have noticed at the top of Depot Hill in the photograph is that the cliff top street, Grand Avenue, extended about a quarter of a mile along the cliff edge, all the way to Sacramento Avenue. Back in the early 1900s, there were also two rows of trees along the cliff top with a pathway between them, known as Lover’s Lane. These disappeared by the 1940s as the cliff gradually eroded.

This stretch of 80-90 foot high cliffs suffers from some inherent geologic characteristics that make it very unstable and susceptible to frequent failure and rock falls. The underlying Purisima Formation is jointed or fractured in a northeast-southwest direction, which has led to the linear orientation of the cliffs from Capitola to New Brighton State Beach. Thick slabs of rock are detached along these joints and fall to the beach regularly, making sitting or walking at the base of the cliff somewhat dangerous. There is also a very soft layer of mudstone at the base of the cliff that is easily eroded, producing an undercut, which then allows the unsupported overlying slabs of rock to collapse. Thirdly, there is no permanent beach along the base of Depot Hill so waves attack the base of the cliff during most high tides, continuing to undermine the cliff.

This combination of factors has led to an average long-term rate of cliff retreat of about a foot every year along Depot Hill. In the 54 years since this photograph was taken, the cliff edge has moved back about 50 feet. Today Grand Avenue only extends to Central Avenue, a distance of about 350 feet. The rest of it is gone and replaced by a foot path, until that also disappears at Hollister Avenue.

What would be hard to recognize because of the trees by the cliff top Crest Apartments on the left side of the photograph, is that six of these apartments are now gone. They were demolished after the 1989 Loma Prieta earthquake due to additional cliff failure that removed the support from beneath the apartments. You can also notice that many of the lots along the inland side of Grand Avenue were empty in this photograph. In the subsequent years, however, every one of those lots has been developed with a home, while the cliff continues to erode at about a foot every year.