DISASTER PREPAREDNESS

County coastal residents are just buying time

By MARK BERGSTROM
Sentinel Staff Writer

SANTA CRUZ — For centuries, man has tried to nest as close as possible to the ocean and still not get wet.

But, in man's competition with the ocean, the ocean eventually wins.

With another winter storm season upon us, workers again are scurrying to put the final touches on projects they pray will hold back the tide.

But, "the best that can be hoped for is to buy some time," says Dr. Gary Griggs, assistant professor of geology at UCSC. And the price, he says, is high.

Homeowners along Via Gaviota in Rio del Mar, where waves and high tides lashed 19 homes last winter, are shelling out almost $3,000 a foot for a seawall they're counting on to hold back the tide. According to Don Brown, project manager for Granite Construction Co., the $2.9-million, 1,000-foot wall is due for completion Dec. 21, one day before the winter solstice.

And, the Capitola Planning Commission just gave approval to two East Cliff Drive residents to construct a 250-foot sea wall that may end up costing each about $50,000.

Griggs says geologists are looking at the history of protective measures to determine which ones have worked and for how long. "A lot of protection doesn't have a very good track record," he says. On the other hand, engineers don't have many options.

Seawalls and rip-rap are standard weapons in the fight and have worked to various degrees. A rip-rap wall at Pot Belly Beach, between New Brighton and Seacliff beaches, spared major damage last winter while waves elsewhere destroyed eight homes and damaged 47 other homes and buildings. Loss exceeded $10 million.

On the other hand, wave action at Seacliff State Beach exposed the skeletons of some of the eight seawalls built there since 1925.

Following extensive wave damage at Seacliff in 1978 and '80, a new piling and timber bulkhead was reconstructed along with the R.V. parking area at a cost of $1.7 million. The new structure was intended to last 20 years, but last January, less than two months after it was completed, waves crashed over the bulkhead and almost 70 feet of the wall was destroyed. Damage to the park was estimated at more than $700,000.

The basic principle of all protective measures is to keep the sand from escaping because the sand acts as a buffer or shock absorber between the sea and the shore.

Griggs notes that already six to seven feet of sand in many areas has been swept away. In an article in the August issue of California Ecology, Griggs and co-author Rogers E. Johnson of Santa Cruz write that the change from summer to winter wave conditions can remove the protective buffer of sand almost overnight.

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Buying time

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Two creative options are to be tried in Capitola this winter. In an attempt to keep the crashing surf from again claiming the end of the Capitola Wharf, workers are putting in 20-hour days to install a bow, like the bow of a ship, which designers claim should deflect the waves.

The other project is the installation of plastic seaweed to try to protect the cliffs of Grand Avenue.

A thousand feet of fake seaweed — gray, synthetic streamers attached to fabric sacks — is scheduled to be installed below the cliff in March at a cost of about $200,000. The streamers are designed to trap sand that normally flows out into the bay.

Much of the problem of coastal storm damage stems from the conflict between oceanfront construction and the inherent geological instability of the shoreline, Griggs and Johnson write in their article, "Impact of 1983 Storms on the Coastline."

Scientists at the Scripps Institute in San Diego have written they believe Californians were lulled into a false sense of security over the past 40 years, when most of the coastline building was done.

"When you build on sand and driftwood, you don't have to be a scientist to know that the wave action brought that sand there in the first place," says Griggs. Painful lessons are learned when the same wave action washes the sand back out.

Scripps scientists now are predicting that the Southern California climate may be in for a period of change with more severe winter storms.

The same may be true for Central and Northern California.

People may have been shocked by last winter's sea storms, but geologists, like Griggs, were not. That's probably because geologists don't talk in terms of 10 or 20 years as history. They talk in billions of years and Griggs has evidence which shows that in the late '30s to mid '40s there were a series of severe storms along the Santa Cruz County coast.

The most-documented historical record (1910 to present) shows there have been at least 20 storms of some significance. That translates into a large storm every 3.6 years on the average, according to the research by Griggs and Johnson.

And, their research shows that whereas there were no recorded major storms for seven years (1916-1923), there were five significant storms in one year alone (1931).

The coastline here has been pounded by severe sea storms in 1978, '81 and '83. In addition, heavy rain in 1982 brought death and destruction in the mountains.

"That's four good storms in six years," says Griggs. Does it mean our winters are getting nastier? Of course, only time will tell.

"The historical record and the damage during the winters of 1978 and 1983 indicate that the northern half of Monterey Bay (Moss Landing to Santa Cruz) is most susceptible to damage when storm waves approach from the west of southwest," Griggs and Johnson write.

"Waves from the northwest, which predominate along the Central California coast, undergo major refraction, which results in a significant energy reduction, as they bend around Point Santa Cruz to strike the beaches of the inner bay. . .

"In contrast, storm waves approaching from the west, west-southwest and southwest pass primarily over deep water on their way to the shoreline within the bay and, therefore, lose little energy. These waves undergo little refraction before striking the coastline directly and have produced the most consistent damage at Capitola, Seacliff, Rio del Mar and adjacent areas."

Griggs and Johnson say that of the 20 large storms which have produced the greatest damage to the coastline here only one came from the northwest, 13 came from the southwest and six are undocumented.

Last year's storm damage was caused by the simultaneous occurrence of high tide and large waves.

The six-foot high tides were not an act of God. "For the Monterey Bay Area, tides in excess of 6.0 feet can be expected 25 to 35 days a year, and tides in excess of 5.5 feet about 100 days a year," Griggs and Johnson write.

"These figures indicate that the probability of large storm waves occurring at times of high tides is reasonably large, and therefore, should be given serious and careful consideration in planning for coastal land use and protection."

The one question everyone is asking as the rain has begun falling again is how severe will the winter be? "That's a big uncertainty in my mind, and clearly in everybody's minds," says Griggs.

If we get severe sea storms again, Griggs has some predictions.

First, he believes areas damaged last year that have not been protected in some fashion could be damaged again. He says, for example, that the Esplanade in Capitola could get hit hard again. "Those buildings are built practically right at sea level," he explains.

East Cliff Drive at Twin Lakes and Moran Lake is in the same situation, with the pavement right at sea level. Already in recent storms, motorists have had to watch the waves before making their way across the stretch of roadway at Moran Lake.

Erosion will continue along West Cliff Drive from the storm-tossed surf. Last winter, waves damaged the bicycle path, the roadway and land at Lighthouse Point as they overtopped the lowest marine terrace and ate up the terrace deposits.

The most striking example of erosion occurred at West Cliff Drive at the foot of Woodrow Avenue.

"For effective long-term protection of public and private interests, there is a need to recognize that large-scale earth processes cannot be subdued at any cost, and that attempts to do so will ultimately end in failure. Coastal land-use controls and a realistic view of coastal protection structures must be based on an accurate assessment of coastal processes and economic factors rather than simply a continuation of past practices and sympathetic and emergency disaster relief," Griggs and Johnson conclude in their article in California Geology.