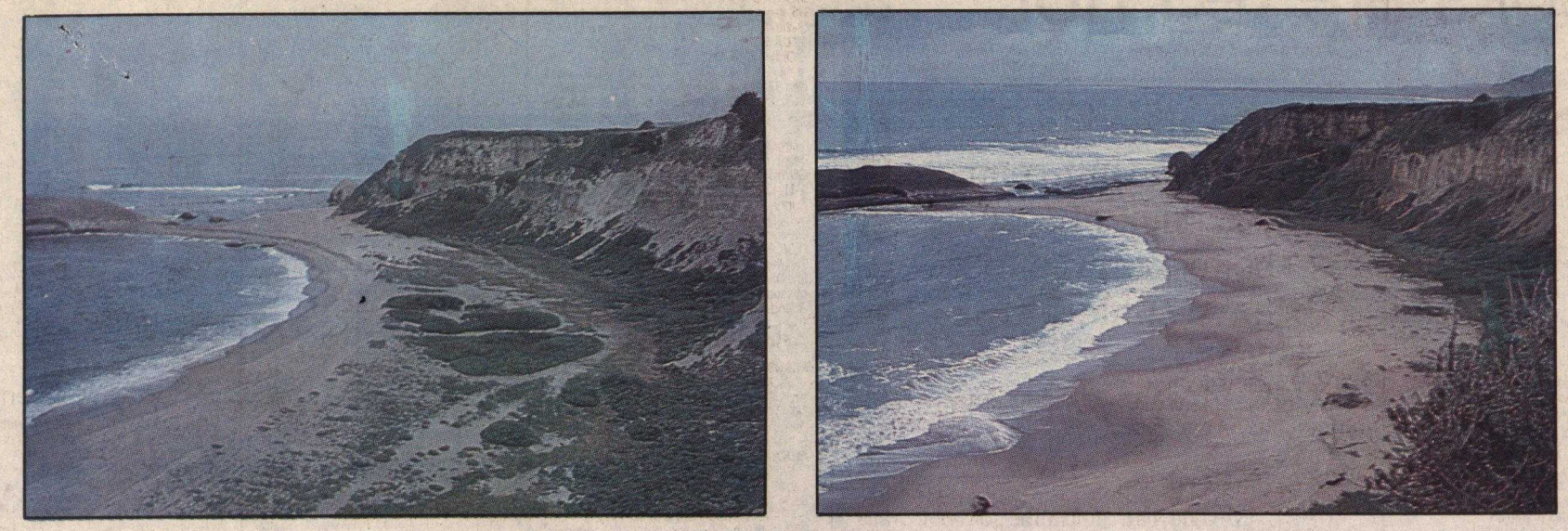


Geologist Gerry Weber points to Greyhound Rock, along the county's North Coast as evidence of our eroding beaches. The photo on the left, taken in 1979, shows the vegetation on the beach. By 1987, right, the vegetation is gone. Weber says he doesn't think the beach will ever be wide enough and stable enough for plants to grow on it again.

2/19/98

The winter rains wash the sand away.
The summer waves bring it back.
But what if the sand didn't come back?
What if our beaches started thinning and the cliffs we thought stable started eroding?
For geologist Gerry Weber, it's more than a hypothetical question.

DISAPPEARING SANDS

Beach erosion

By LOU BERGERON
Sentinel correspondent

IF YOU WENT down to Lighthouse Point a few weeks ago, you may have noticed that Its Beach was looking a lot more like Its No Beach. In short, the beach was gone. Even now, there's only a thin wedge of sand, dotted with boulders at the base of the cliffs.

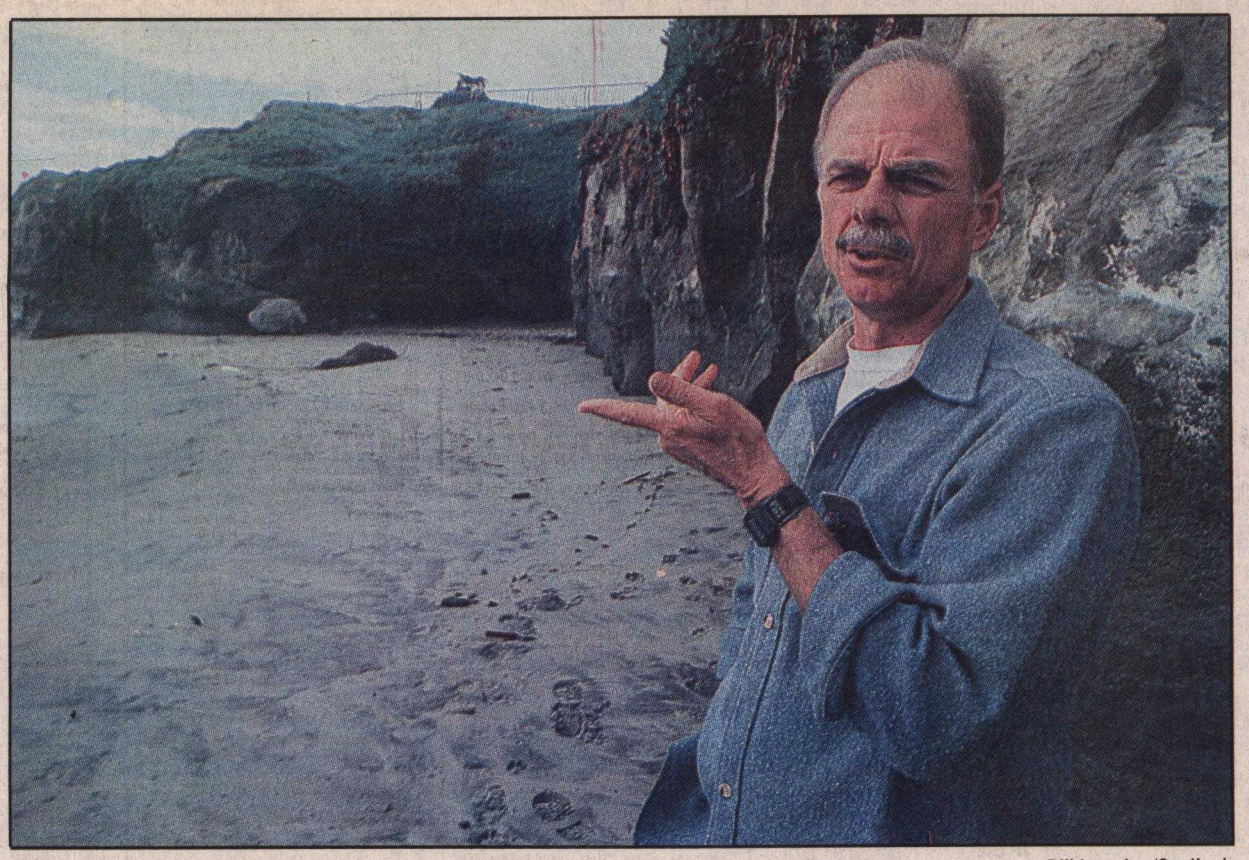
The same thing happened on beaches all around Santa Cruz County. Capitola Beach withered to a thin strip of sand even at low tide. At Scott Creek, the north end of the beach thinned so much that waves were crashing against the riprap along the embankment of Highway 1.

The exodus of sand from area beaches happens every winter when storm waves come thundering into the coastline and explode onto the beaches and cliffs, stripping sand away and dumping it at the outer edge of the surf zone.

After storm season ends, gentle spring and summer waves slowly wash sand back onto the beaches. By June the beaches are back at full width for the summer tanning season. It's all part of a yearly cycle that most Santa Cruzans are familiar with, especially the surfers.

The veteran surfers of the Santa Cruz Surf Club have seen the seasonal shifting of the sands as far back as the 1940s, long before there was a Dream Inn or a jetty at the harbor. They've seen the changes wrought by both man and nature, but even they have been struck by the dramatic changes this winter.

"I've never seen it this bad," said Mac Reed, referring to the sand loss at Its Beach. But Reed and the other club members know from experience that the sand will return. "Some of it's back already," said Harry Mayo.



Bill Lovejoy/Sentinel

The loss of sand, such as we saw this year, will become much more frequent, says Gerry Weber.

But not everyone thinks all the sand will return. Local geologist Gerry Weber thinks the supply of sand for area beaches is shrinking. If his theory is right, the dramatic wintertime sand loss seen on beaches this year will become a much more common event. It will also affect beaches that usually stay large except during the very stormiest winters, like Seacliff State Beach in Aptos, or Sunset State Beach near Watsonville.

With less sand on them, the beaches will be washed away by winter storms more readily. As for the houses built on those beaches, as Weber puts it, "They're going to be under more frequent attack" by the waves.

"You're always going to have some big storms that will severely affect the beach, but it's going to become a more frequent event," said Weber. "In the long run, these homes may all disappear.

"With all of those homes, all you have to do is look where they are," he said. "They're on the beach. They will eventually succumb to the ocean. It's just a matter of when."

The sea cliffs now protected by beaches also will be exposed to attack by the waves, and the cliffside properties that are so coveted today will require more and more protection from the waves.

Just when these changes in the stability of the beaches might begin showing up is difficult to predict. Weber says if we have mild winters, it could take decades. On

Please see DISAPPEARING — C6

Disappearing sands

Continued from Page C1

the other hand, if we have several winters in a row with big storms, he says, "It could start showing up dramatically in the next few years."

Shifting sands

Weber is a lecturer in Earth Sciences at UC Santa Cruz and has been a consulting geologist for almost 25 years. He has been watching changes on the beaches north of Santa Cruz since 1971, and by 1979 was convinced that the long-term stability of the beaches was changing.

The beach at Greyhound Rock is a prime example of what Weber has seen. Fifteen years ago, there was a pile of rubble at the base of the sea cliffs that was covered with plants. Willows and shrubs grew there, and had spread over a good portion of the beach. Those plants survived the big storm waves in 1983, but by the mid-'80s the beach had been stripped of its vegetation.

Although some of the sand will come back to the beach at Greyhound Rock, Weber doesn't think it will ever be wide enough and stable enough for plants to grow on it again. "I'd say probably the beach is never going to establish again to the same width it was before."

Weber thinks the changes at the beach by Greyhound Rock are a result of erosion at Point Año Nuevo. Judging by descriptions and maps from early European explorers of the California coast, it appears that Point Año Nuevo used to extend all the way out to Año Nuevo Island. When the point stuck out into the ocean that far, it acted as a huge barrier to sand moving down the coast, and millions of cubic yards of sand piled up on the north side of the point. When the point eroded through, probably sometime between 1600 and 1800, the sand started to work its way south.

That massive input of sand built beaches up far larger than normal, well beyond their stable size. Weber said that most of the huge sand mass has already passed through the North Coast beaches, and the peak of it has probably even worked its way through Santa Cruz.

A different view

Weber isn't the only one who's been watching the beaches. Gary Griggs is another local geologist who has spent years working on beach and cliff erosion problems in Santa Cruz County — but he doesn't necessarily agree with Weber's assessment.

Griggs, who is the director of the Marine Studies Institute at UCSC, said that although he hasn't scrutinized the North Coast beaches in particular, the studies that have been done in Santa Cruz indicate that if anything, most of the beaches are getting larger, not smaller.

"I have a lot of respect for Gerry," said Griggs, who allows "Año Nuevo might've provided kind of a temporary obstruction." But if the peak of the sand mass from Año Nuevo has already passed through town, Griggs said, "We should have seen a significant loss" of sand on local beaches. "I'm not convinced I've seen anything long term," he said.

Jim Tait, a graduate student of Griggs', has been measuring the beach at Via Gaviota for the last seven years. His measurements show during that time the beach has been widening about 6 feet a year.

Although the beach at Via Gaviota grew wider over the past few years, the storms this winter have undone most of that growth. At the beginning of February, the beach had been cut down an average of 3 to 4 feet, with some parts losing as much as 9 feet of sand. Tait said most of that sand was probably removed during the first two weeks of January.

Weber said that although he thinks much of the sand from Año Nuevo has passed through the area, sand is still making its way south, and that may be the reason Griggs and Tait haven't seen major changes on the beaches of Santa Cruz.

"I think that the decrease is going to be larger in the north than in the south, and that decrease will slowly migrate down the coast," he said. "Griggs and Tait are looking at modern sand movement in short term cycles," said Weber. "I'm looking at a cycle that takes many hundreds of years. It would be natural for people looking at the short-term picture and the ultra long-term picture to have very different perceptions of what's going on. We're looking at different things and what I hope is that we can integrate them and make sense out of them."

More evidence

Weber also bases his theory on what is happening to the piles of rock that sometimes accumulate at the base of a sea cliff. Called "talus piles," these rocks only accumulate when the cliff is not exposed to attack by the waves. If the waves reach the cliff, they wash the talus piles away.

Judging by the presence of talus piles, Weber is convinced that sea cliffs from Año Nuevo to the mouth of the Pajaro River have "very clearly been free of erosion for hundreds of years.

"If there's a significant sized talus pile that's vegetated at the bottom of a cliff, that indicates that cliff hasn't been attacked by erosion for a long time. What I'm looking for is when the talus piles get attacked and stripped out," said Weber. "That's the major piece of geologic evidence.

"In 1983, in and around Via Gaviota, the toes of the talus piles were cut (by the waves) for the first time I'd ever seen," said Weber. Although the talus piles weren't completely eroded away, he said just the fact that they were cut into represents a change.

A natural process

So what will happen if Weber is right? Owners of beach houses will be forced to spend more and more time and money trying to defend against the attack of the waves. They can try building sea walls, but sea walls are no guarantee. In the early 1980s, a sea wall at Seacliff State Beach that was designed to last for 20 years was destroyed in two months.

Beach house owners could try trucking in sand, which has been done in Southern California. But getting permission to dump more sand on the beaches might not be easy. Permits would have to be issued by one or more government agencies. Adding sand to the beaches could have an impact on marine life near the shore, and might not be a popular idea locally.

Trying to save the cliffs from erosion may be easier, but it will have a price beyond the simple cost of construction. Riprap, piles of large boulders placed in front of a cliff, can be an effective defense against the waves. But cliff erosion is one of the sources of the sand that builds the beaches. When too much of a coastline is protected by riprap, the sand supply to the beaches is diminished even further. The further loss of sand only worsens the problems the riprap was supposed to solve.

The best way to deal with cliff erosion, according to a 1994 report on the Monterey Bay region by the California Coastal Commission, is to develop a regional strategy for protection, so that measures taken in one location don't have a negative impact on the rest of the cliffs.

Ultimately, man may not have much success in stopping the actions of nature. Cliff erosion is a natural part of the evolution of a coastline, and any attempts to stop it will only slow it, at best.

If the sand supply is shrinking as Weber suspects, then "we're going to have a major change in the way things go. And we really don't have much choice in the matter."

The storms taketh, and the storms giveth

By LOU BERGERON
Sentinel correspondent

SAND YOU SEE on Its Beach one summer was probably at Mitchell's cove the year before, or maybe even Natural Bridges. Sand that you sat on while lounging at Seacliff Beach last year probably spent the previous summer propping up sunbathers on New Brighton Beach, or in front of the Esplanade in Capitola.

The direction of the swell along the coast determines the main direction of sand movement along the coast. As the waves wash in, they slowly move sand through the surf zone between a half mile and a mile a year, unless some barrier blocks its path.

Jim Tait has mapped a lot of barriers along the Central Coast. Tait, a doctoral candidate in Earth Sciences at the UC Santa Cruz, for the past seven years has been studying where the sand on the beaches of northern Monterey Bay comes from and how it gets here.

Tait and Roberto Anima from the Branch of Pacific Marine Geology at the U.S. Geological Survey used sonar to map a series of underwater basins and ridges along the coast from Point San Pedro north of Half Moon Bay to Santa Cruz Harbor. Some of the ridges tower 40 feet above the basins they separate. The rocks you see barely poking out of the water beyond a point are "like the tip of the iceberg," Tait said. "There's a lot more down there than you'd ever suspect."

Undersea ridges extend out from the headlands all along the coast. The ridges act as barriers to sand, holding it within the basin until a storm generates waves large enough to wash the sand over the ridge.

Because of the rocky nature of the coast, sand can't just move along a beach indefinitely.

"It has to move off shore in order to bypass large headlands. Then it has to contend with submerged offshore ridges in its journey to the south," said Tait. "Without big storm waves to move sand past the ridges, sand within a basin would just move back and forth within that basin.

"It's sort of a yin-yang thing," said Tait. " The storms do a lot of damage to the cliffs by stripping the sand off the beaches and exposing the cliffs to more erosion, but at the same time we actually need these big storms to replenish the beaches."

Gary Griggs of UCSC disagrees with Weber, saying studies show beaches getting bigger, not smaller. 'I'm not convinced I've seen anything long term,' he says.