

Anita Whitis zeroes in on sea level measurement.

Geology

## Headquartered Here

# Geodetic Survey Study: Sea Level Differences

By TOM HONIG

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Have you ever tried to draw somebody's face and when you get to the chin, the lines miss?

The U.S. Geodetic Survey knows the feeling. Its figures indicate that sea level in Northern California is about a meter different from sea level in Los Angeles. And they can't just crinkle up their computer readouts and start over again; things operate more scientifically than that at the Geodetic Survey.

Several survey parties from the Geodetic Survey department — under direction from the U.S. Commerce Department — have been operating out of temporary headquarters in Santa Cruz County during recent weeks as part of an effort to resolve the discrepancy.

It's a very serious job. Daniel Frazier, the chief of the party, said that scientists are becoming concerned about earth movements in the Southern California area, and are keeping an intense watch on movements of the earth. A bulge seems to be building in the mountainous region of Palmdale, northeast of Los Angeles, and, according to Frazier, geologists have predicted that a serious earthquake might be imminent.

To deal with that possibility, a one meter discrepancy in measurements of the California coast is not permissible. So Geodetic Survey officials, from their offices in Maryland, de-

cided to send survey parties to California to survey the entire coastline until the one meter discrepancy is explained. Currently, teams are operating between San Francisco and Los Angeles; the group whose headquarters are here are surveying between San Francisco and Big Sur.

Why did they choose Santa Cruz? (Or, more particularly, Scotts Valley?) Northern Monterey Bay chauvinists will be disappointed, because there was one very practical reason: Santa Cruz is roughly halfway between San Francisco and Big Sur.

The surveyors working locally have been here since November, and should be finished with their work by early February. Their office is hidden from view in the Holiday Inn travel park in Scotts Valley, and members of the party have taken private lodging throughout the Santa Cruz area.

They are quite visible to Highway 1 motorists. Generally, the survey team works by the side of the road, making new measurements and checking them with old ones. Those measurements are based on fixed points, or landmarks, which usually consist of Geodetic Survey metal markers sunk in cement near the road. The survey teams march slowly along the side of the road, taking measurements of altitude, and recording the results.

Results are actually recorded by calculators onto cassette tapes, which in turn are hooked up to machines in the temporary office in Scotts Valley. From there, the data is sent by telephone wires to the big computers in Maryland. The big computers — ideally — will be able to figure out why past records are off by a full meter.

So far, the latest measurements match with old ones, so the discrepancy has yet to be resolved.

The life of an orange-vested surveyor is a transient one. Employees of the Geodetic Survey — unless they are office-types located in Maryland — are on the go throughout the year. For Frazier, the last 24 years have been spent on the

road. For years, he took his family with him, but since his two sons entered high school, his family has settled in Virginia. "Now they're interested in sports, and you can't be on a team and move around all the time."

In 24 years, there may not be a section of the country that Frazier has not seen. "It's a real thrill to travel during the first few years, but now I'm getting tired of it."

While Frazier's work is largely administrative, he is nevertheless proud of his and his associates' abilities as surveyors. "We think we're the best, and would match our accuracy against anyone's."

At one time, surveying jobs for the Geodetic Survey were property of men, but that has changed. Anita Whitis, the head of one of the surveying parties, is one of the ever-increasing number of women to work on the crew. "She works step-for-step with any of us," Frazier said.

Obviously, the margin for error is slight, realizing that a one-meter error between San Francisco and Los Angeles is cause for alarm. On a windy bluff looking over the ocean, Whitis stepped back from her surveying scope and said, "Let me show you how far off we can be on any measurement."

She pointed to a long white pole, calibrated with a centimeter scale. The black tick-marks on the scale are about a millimeter wide, maybe less, and the width of that mark is the largest allowable margin for error on measurements.

In addition to gaining information about where old Geodetic Survey records are wrong, the survey will be useful in other ways, Frazier said. All the data will be published, and available to surveyors, engineers and anyone who needs accurate landmarks for their map work.

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## Santa Cruz Sentinel

Established 1856

Published Sunday morning and every afternoon except Saturday and certain holidays by Santa Cruz Sentinel Publishers, Inc., at 207 Church St., Santa Cruz, California 95060. Phone 423-4242.

Fred D. McPherson, Jr., Publisher

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In Santa Cruz County, In Advance

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Six Months.....\$18.50  
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Other mail rates on request. Second class postage paid at Santa Cruz, California 95060.

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