Quake robbed county of water

Underground storage disrupted, according to UCSC geologist

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SANTA CRUZ — After the 1989 earthquake, creeks throughout the county suddenly gushed forth as much as twice their normal flow of water, "stealing" from the county's underground water, a geologist said Wednesday.

A UC Santa Cruz geologist who has been studying the phenomenon discussed his findings at a meeting of the county's Water Advisory Commission.

Since the earthquake, Robert Curry has studied water samples taken from streams and wells from San Francisco to the Pajaro River, trying to answer several questions for the National Earthquake Hazard Reduction Program of the United States Geologic Survey.

For one year after the quake, total flows from streams and springs increased by as much as 70 percent, he said. Almost 20 billion gallons of stored groundwater were released in the year after the earthquake.

That increase was temporary, and actually robbed water from our underground storage, said Curry.

"We really did steal from the future in getting the water out during the earthquake," he said. "The reason we got more water was simply because the ground fractured."

Curry said the fractures were existing ones, and not sources of new water supplies.

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"It was young water being shaken loose," he said. "It isn't deep water from magical sources."

The amount of water released was equal to a few inches of rainfall, he said, and would not have meant a significant loss to the area if we weren't in the midst of a drought.

In fact, if the county hadn't been in a drought, the stream changes might not have been noticed at all.

The increases seemed dramatic in many cases, he said, because the creeks were not running at all.

By studying old newspaper articles and other historical sources, Curry said, he learned that the increased flow paralleled that of past earthquakes, especially the quake of Oct. 9, 1885.

Curry read from an account in the Santa Cruz Sentinel of Oct. 14, 1865.

" '... All the mountain streams, immediately after the earthquake, commenced rising. The Pajaro has half more water; Coralitas, twice as much, and the Soquel near the same. The flour mill of Hames and Daubenbiss is now running night and day; before last Sunday the water only allowed eight hours' work. The San Lorenzo is considerably higher, also the streams north of this, up the coast.' "

"The distribution of the changes in 1865 was about the same as the changes in 1989," he said.

Three months later, an 1865 Sentinel article noted that the streams were still full of water. The change was believed permanent, which Curry said was not the case.

"However, careful review of newspapers and other historical sources did not provide any clues to the recovery times for displaced groundwater, dewatered wells or surplus streamflow," noted Curry's unpublished paper.

The 1906 earthquake yielded fewer clues, he said, because it came during a time of abundant stream water.

No significant chemical changes between pre-quake and post-quake water were noted in his study, and there were no relationships between the distance from the epicenter and the amount of increased flow.

Using graphs of stream flows, he noted that streams have had higher than normal flows for a range of six to 18 months, with the average at about one year.

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>
> — *Robert Curry, UCSC geologist*

Curry said one important lesson is that after an earthquake,creeks can be expected to have higher-than-normal runoff. This is because the water holding rocks of aquifers have less ability to store the water that percolates down to them.

Still being debated is the question of whether the water was shaken from the rock, as Curry believes, or whether it was squeezed from the rock, as a team of European researchers believe.

Either way, the result is that the water is released from the rocks and gushes forth until the rocks recover from the earthquake.

How soon that recovery will be is still an unanswered question.

Curry also offered a tantalizing glimpse of a possible method of earthquake prediction.

Graphs of stream flows have shown a definite increase, then a drop in water flow just before the earthquake.

"It really did measure something that was going on in the crust of the earth," he said.

But the increase is very slight, he said, and is only evident in retrospect.

"It's so small it's within the background noise," he said, noting it can be as easily confused with such events as a logjam clearing up, or kids playing in the river.