

# Lake in crisis

*Continued from Page A1*

the Live Oak area, which was mostly farms. Waves crashed over the sand barrier between the lake and the coast; saltwater flowed in. At other times, the fresh water poured over the barrier toward the ocean.

Back then it was a lagoon, a highly productive biological system that supported a variety of native plants, fish, birds and other organisms, according to the state-authored Twin Lakes Beach General Plan.

Urbanization began to replace the farms of Live Oak. First, a bridge was built on East Cliff Drive between Schwan Lake and Twin Lakes Beach. The bridge pilings restricted some of the exchange of fresh and salt water.

In 1930s, the present ground-level road, East Cliff Drive, was constructed between the lake and the beach, according to the general plan. A culvert was installed under the road to allow the overflow of fresh water to run out to the ocean. But the road restricted the saltwater from flowing in, beginning the change from lagoon to fresh water lake.

Construction of the Small Craft Harbor breakwaters in 1977 caused Twin Lakes Beach to grow wider, eliminating any chance of saltwater flowing in. The lagoon had become a lake.

In summer, the lake would dry up, creating offensive odors and revealing all sorts of debris on its bottom. Because of citizen complaints, the county installed a small dam that maintains the lake water at a constant level.

Plants multiplied in the fresh water that now filled the lake year round. In the summer of 1988, those who use the lake realized it was being taken over by plants. In May of 1989, they began collecting plant samples and taking them to the UCSC marine advisor for identification.

"We saw quite quickly we had a problem beyond our expertise," said Smith.

The group asked Lars Anderson, an aquatic plant scientist in Davis, to take some samples. His information was instrumental in convincing the state government this year to designate the lake as an impaired water body, said Smith.

This designation placed the lake on six of eight Clean Water Quality Act lists put together by the federal Environmental Protection Agency. Because its on these lists, the lake is eligible for federal funding, said Smith.

"The objective of this whole thing is to formulate a lake management plan," said Smith. No one is sure how to save the lake; they are just sure they want it saved.

But plans — and their ultimate implementation — take money. In July, the state Water Quality Control Board agreed to finance its part of a \$50,000 Clean Water Quality Act grant to study water quality. The Environmental Protection Agency in January will decide on the grant, said Smith.

In the meantime, at the request of Assemblyman Farr, the university has gotten involved. Bob Curry, professor of environmental geology at UCSC, formed a year-long class in September to collect information about the lake.

Students are periodically taking water samples, measuring the volume of water, and sampling bottom sediment. They have established that the depth is uniformly about six feet. They have done a land survey around the lake.

The information they collect will supplement the study that will be funded by the federal grant.

It's too early to report results, said Curry, but the students have gathered some interesting information on the lake.

Flood water, caused by the paving over of most of Live Oak, is much greater than it ever was, said Curry. The lake collects the water that drains from the hills above Dominican Hospital all the way to the coast. And the lake has a year-round supply of fresh water from a stream that runs under streets and through culverts in Live Oak. The stream, said Curry, hasn't dried up during the last three years of the drought. And it appears it also didn't dry up during the 1977 drought, he added.

Asked to give a prognosis on the state of Schwan Lake's health, Curry said, "...It is in the advanced stages of filling with vegetation and becoming a marsh or meadow.

"This is a natural process because of the influx of so many nutrients without any way of getting them out. The nutrients come from a variety of sources — people's lawns, from people's leaking sewage systems ..."

One possible solution, Curry suggested, is to introduce herbivorous fish to the lake. They graze on aquatic plants just like cows graze on grass.