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Red tide research to start

By Peter B. Matuszak

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On Monday, visitors from USC will be submerging three black kegs in the marinas and off the Harbor Patrol dock in Redondo Beach. However, they are not disposing of remains from the celebration of the school's recent football victory over the University of Michigan in the Rose Bowl. Rather, these barrels contain cutting-edge sensors that aim to unlock the biological mystery of red tide algae blooms.

David Caron, a professor of biological science at USC, is leading a team of researchers dedicated to understanding changes in oxygen levels and other toxins associated with the types of fish kills that have frequented the Redondo Beach harbor in the summertime.

After two massive fish kills in 2005 the city formed the Water Quality Task Force to address how the community could respond to this and other water problems along the shore. Caron met Councilman Chris Cagle through the task force in 2005 and since then he and his colleagues have been working toward observing firsthand what happens in Redondo Beach when the tide turns toxic to marine life. Volunteers cleared an estimated 10 tons of fish carcasses out of the harbor during the worst of the fish kills in 2005.

"What I have suggested to Chris is that what we observe should be able to tell you if dissolved oxygen is the problem," explained Caron. "Then these sensors could act as an early warning system for the harbor."

This sort of sensing system was one of two goals for combating red tide problems in the harbor. Once it is determined that lack of oxygen is the problem causing the fish to race into the harbor and die, an aeration system could be used to counteract the problem. Finding funding for an aeration system is another of the group's 33 recommendations for improving the water quality in Redondo Beach that came out of its yearlong study. These pumps can cost upward of \$250,000.

However, there are several types of algae problems that can cause fish kills. Over the last three years, as Caron has studied the waters from Malibu to Huntington Beach, he has also observed blooms that excrete toxins rather than just absorbing all the oxygen in the water. If this were this type of bloom occurring in Redondo Beach, it would require a completely different plan to combat it. Sometimes these blooms even originate in the harbor themselves rather than flowing in from the ocean.

"We can conjecture until the cows come home, but we really won't know anything until we get the sensors in the water and start taking in data," said Caron.

The research is being funded through federal money from the National Science Foundation, which has supported research at UCLA to develop the sensor relays that will be used in the project. Caron and his USC team is now taking that technology and putting it to practical use in applications such as this. Once they have established baseline samples this winter while the water is cold and not conducive to algae blooms, they will be ready for the summer months when these occurrences are more common. Then they will monitor the activity of these microscopic elements that affect the ocean life more than any other factor.

"Most of what actually takes place in the ocean happens with things you can't see and I don't

think there is a real wide appreciation of that fact," explained Caron.

City officials feel fortunate to have found such a beneficial partnership with USC.

"It feels really good to be part of a research project that is on the cutting edge and has the potential of being able to solve a problem that not only affects our region but solves a nationwide problem," said Cagle. "Algae blooms are a problem all along the West Coast and in the Gulf of Mexico as well."

According to Cagle, the city will also be working through its Washington, D. C., lobbyist to encourage the EPA to extend funding for Caron's research when the current federal grant money runs out later this summer.

"This is something the city can do to return the favor to the university. We have a lot of pull with these large agencies and can help to keep their research going," said Cagle.

This is one of two water studies beginning this year in Redondo Beach. The other run by the Los Angeles County Sanitation District aims to track the source of bacteria problems south of the Redondo Pier. That study will test DNA to track the source of high bacteria levels that continuously earn the area failing water quality grades. Both of these studies are innovating new ways of understanding local marine ecology.

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