

Critical Monterey Bay kelp threatened by urchins

By Dennis L. Taylor

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Thanks to a convergence of factors, Monterey Bay's critical kelp forests are being chewed up by a voracious and rapidly growing number of sea urchins, losses that can have a domino effect on the bay's ecosystem.

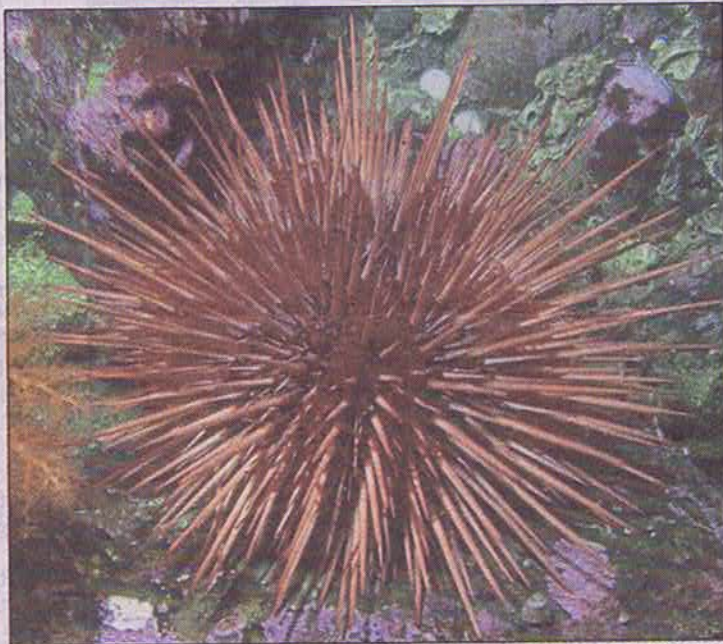
Like everything in nature, when one part of an ecosystem is in distress, many other parts suffer as well.

Dr. Jim Barry, the senior scientist and chairman of the research division of the Monterey Bay Aquarium Research Institute, said that a combination of nutrient-poor warmer seas and diseased predators that usually keep urchin populations in check are depleting one of the most important elements of Monterey Bay's ecosystem.

"Kelp is the base for the entire ecosystem," Barry said. "It produces lots of food that feeds everything else in the kelp bed — including snails and urchins and then all the things that eat those. Many fisheries depend on kelp beds for nutrients."

The problem began five or six years ago when a warming of Pacific Coast waters was discovered. Dubbed "The Blob," the large mass of warm water reached a size of 1,000 miles long, 1,000 miles wide and 300 feet deep, according to climatologists at Washington State University. It affected most of the California, Oregon and Washington coastlines.

Ocean temps here vary a lot, Barry said. While climate change has some role, there are natural fluctuations in temperatures that occur in the ocean. El



COURTESY OF MONTEREY BAY MARINE SANCTUARY

Red sea urchins, along with their purple urchin cousins, have a voracious appetite for Monterey Bay's kelp.

Niño and La Niña years are one example. Research has shown Pacific waters have warmed by roughly one-degree centigrade (1.8 degrees Fahrenheit) since the 1930s.

Warm water carries far less nutrients than what the bay's ecosystem requires, effectively starving and thinning the kelp. At the same time, a wasting virus hit sea star populations which are natural predators of urchins.

Amanda Kahn, a professor of invertebrate zoology at Moss Landing Marine Labs, said the virus is naturally occurring, but during the warming period, sea stars became more susceptible to infection.

"We know the sea stars' abil-

ity to fend off the virus was compromised," Kahn said. "What we don't know are the mechanics of what caused the susceptibility — was it a weakened immune system or a stronger virus? We just don't know."

With the ranks of their natural predators reduced, two primary species of urchins — red urchins and their cousins purple urchins — began to thrive. And kelp is high up on their lunch menu. Kahn explained that since urchins are not particularly mobile they eat the base of kelp plants rather than the fronds, and in the process severing the kelp from its base and allowing the plants to float up and away.

In one respect the urchins are

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— Amanda Kahn, professor of invertebrate zoology at Moss Landing Marine Labs

eating themselves to death. Typically they will live in crevices in rocks and wait for tiny pieces of kelp drift to find its way into the cracks. The fact that they are leaving their hiding places and attacking the kelp plants themselves is a sign they could be desperate, Kahn said.

There was a kelp forest off the breakwater from Coral Street in Pacific Grove near Lucas Point. It's now all but barren, divers report. Well, not barren; there are plenty of urchins.

"Kelp is like the trees in the forest that are home to many animals," Kahn said. "Many of our iconic Monterey Bay animals depend on kelp."

So what to do about it? Barry noted that on a local level volunteers divers could be recruited to cull some of the urchins.

That's exactly what Marina Del Mar-based Reef Check California is doing with an experiment it is conducting in Monterey Bay.

Keith Rootsart is a Reef Check volunteer who trains fel-

Kelp

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low divers to collect and record data from the urchin strongholds to measure how effective human culling of the urchins can be.

Rootsaert, who also sits on the Monterey Bay National Marine Sanctuary advisory council, said his team has a Scientific Collecting Permit for the experiment area about a quarter mile offshore of Lovers Point. He has seen the damage close up caused by the demise of sea stars.

He calls sea stars apex predators of urchins. "They are the vacuum cleaners of the reefs."

Diving through kelp forests, Rootsart said they are excellent breeding grounds for marine life, including sea otters. As the kelp forest dies back, so does the protection otters have to hide from predators, he said.

It's not just marine life that depends on kelp. Humans derive benefits as well. Rootsart said kelp is excellent at sequestering carbon, a key component to climate change. Kelp also

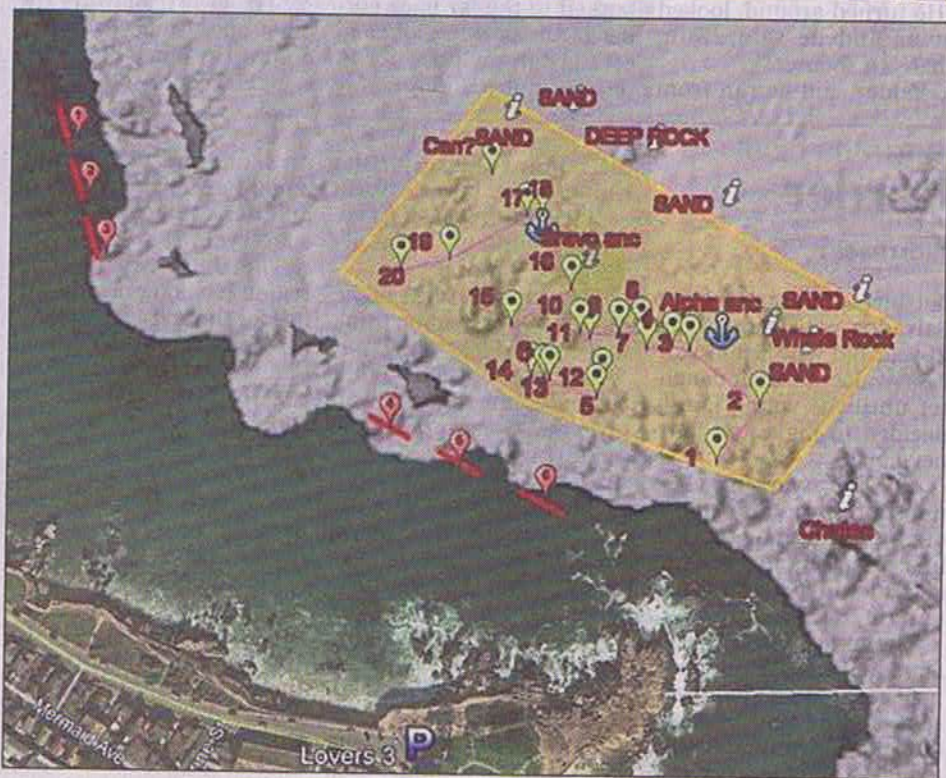
slows down waves to protect beaches from excessive erosion.

He and other divers have watched the kelp forests fall one by one. "We lost Point Pinos in 2014, Coral Street in 2015

and Lovers Cove in 2017," Rootsart said. "Now 2019 the area off Cannery Row and Otter Cove are under threat."

The results of the experiment Rootsart is helping to coordinate won't be known, but he, Barry, Kahn and other scientists are keeping a watchful eye on the degradation.

"We are concerned," Barry said. "We don't want this to become the new norm."



This map shows the spots Keith Rootsart and his team of volunteer divers are conducting research on how to cull purple urchins.

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one challenge of finding an executive to fill the post is the high cost of living in the area.

The chamber, whose goal it is to support member businesses and the regional economy, is searching for a candidate with a skill set that is balanced and who can elevate the Monterey Peninsula Chamber of Commerce. The organization hopes to find the ideal person within the community to take on the role with the support of the Monterey Peninsula Cham-

ber. "One thing we wanted to stress is that with climate change, coastal areas of California are predicted to get more rain than we do currently," Ginger said. "So we're concerned that the increase in rain is going to bring with it more instances of poor water quality."

On the bright side, 94% of the

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