



A diver inspects giant brown kelp that's been stripped down by purple sea urchins. Photo by WaterFrame/Alamy Stock Photo

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## A Cull to Save the Kelp

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An innovative project is rehabilitating California's kelp forests after decades of degradation at the hands of environmental decay and sea urchin predation.

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by Erica Gies (</profiles/erica-gies>)

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Terry Herzik has been diving for red sea urchins in Southern California for more than 40 years. He supports his family by selling the spiny invertebrates' gonads as the sushi delicacy *uni*. Yet over the past century, Southern California's giant kelp ecosystems—the red urchin's home turf—have been under assault. Spurred on by human-induced environmental degradation, a booming population of voracious, kelp-munching purple urchins has helped turn these once-lush forests into barren wastelands. In such a diminished habitat, the red urchins' numbers (and their gonads) have shrunk.

So, three years ago, Herzik joined an ambitious project spearheaded by the nonprofit [The Bay Foundation](https://www.santamonicabay.org/) (<https://www.santamonicabay.org/>) to restore Southern California's kelp forests, and he's been killing purple urchins in droves ever since.

community volunteers) have killed 3.3 million purple urchins, clearing 142,000 square meters of seafloor of the animals. As a result, the kelp has bounced back.

Started in 2013, The Bay Foundation's kelp restoration project is the largest of its kind. Executive director and marine biologist **Tom Ford** (<https://www.santamonicabay.org/about-us/staff/>) says the project's goal is to restore more than 600,000 square meters of seafloor off of California's Palos Verde Peninsula (just south of Los Angeles), by reducing the purple urchin concentration from as much as 70 urchins per square meter to just two. After two years, Ford says that follow-up measurements of the populations of various marine species that rely on the kelp ecosystem prove their efforts are working.

Herzik agrees that the purple urchin cull has had a dramatic effect. "We can't even recognize the areas we started in a couple of short years ago," he says. "It's a completely vital, mature kelp forest. It's full of life, and before, the barrens were like moonscapes."

Kelp grows where cold, shallow, nutrient-rich water covers a rocky seafloor. The yellow-brown algae regularly grow up to **35 meters tall** (<https://earthobservatory.nasa.gov/Features/FloatingForests/>), and provide food and shelter for more than 800 species. But as in Southern California, many of the world's kelp forests are shrinking.

Over the past century, myriad causes—including water pollution, declines in urchin predators caused by overhunting, and climate change—have caused the kelp canopy in Palos Verde Peninsula to shrink by 75 percent. The kelp restoration project is still in early days in terms of reclaiming that area, but initial reports are promising. The researchers found that kelp at two restoration areas are 100 to 1,000 times denser than before.

The kelp's speedy recovery, says Ford, is driven by the algae's astounding ability to reproduce and grow. Young kelp, "just one cell, are out there by the trillions after a good reproductive season, so replacement of adults by the next generation is quick and comprehensive," he says. Giant kelp grows amazingly fast, up to **half a meter per day** (<https://earthobservatory.nasa.gov/Features/FloatingForests/>). And with the kelp's recovery, the researchers have seen the return of indicator species, such as algae, that live under the kelp canopy, and finfish such as kelp bass.

Ford says these early observations are so positive that he's been fielding inquiries from scientists, conservationists, resource managers, and fishermen from as far afield as Japan, Norway, New Zealand, Australia, and Canada, who are looking to reproduce their results.

However, restoration is not as simple as killing millions of purple sea urchins. Behind the scenes, political negotiations and efforts to involve the fishing community have been important facets of the project.

Partnering with urchin fishers was something of a coup. Historically, fishers have been tough, effective lobbyists for preserving the urchins, even at the expense of the kelp forests. Case in point: in the 1980s, urchin fishers encouraged the United States Congress to create an "otter-exclusion zone" in Southern California to reduce this predator's toll on urchin populations, despite the fact that otters are a protected species. (The policy was rescinded in 2012 by the US Fish and Wildlife Service because many otters died during

that, he and the team at The Bay Foundation conducted a study that showed red urchins have bigger gonads (up to 484 percent larger) in kelp forests than in barrens, meaning that kelp restoration would improve fishers' harvest.

Like many fishers, Herzik says he was initially cautious about working with scientists. But now, he's inspired by the work. "After being fortunate enough to raise a family from the bounty of the ocean, here was an opportunity to give back," he says.

Correction: An earlier version of this article said that, in the 1980s, sea otters were a protected endangered species. Sea otters did not acquire "endangered" status according to the IUCN (<https://www.iucnredlist.org/details/7750/0>) until 2000.

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