

# From urchin crushing to lab-grown kelp, efforts to save California's kelp forests show promise

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Scientific diver Morgan Murphy-Cannella holds bull kelp with a dark patch of reproductive spores as she surveys a reforestation project, Friday, Sept. 29, 2023, near Caspar, Calif. Kelp forests play an integral role in the health of the world's oceans, one of the issues being discussed at the United Nations climate summit in Dubai. Credit: AP Photo/Gregory Bull

A welding hammer strapped to her wrist, Joy Hollenback slipped on blue fins and swam into the churning, chilly Pacific surf one fall morning to do her part to save Northern California's vanishing kelp forests.

Hollenback floated on the swaying surface to regulate her breathing before free diving into the murky depths toward the seafloor. There, she spotted her target: voracious, kelp-devouring purple urchins.

Within seconds she smashed 20 to smithereens. "If you're angry, it's a cathartic way to get it all out," Hollenback joked. "It's ecologically sanctioned mayhem."

The veterinarian who lives in Berkeley, California is part of a crew of volunteers who swim, snorkel and dive armed with pick axes and hammers on a sole mission: To crush purple urchins that largely destroyed 96% of California's iconic bull kelp forests between 2014 and 2020, and with it harmed red abalone and other [sea life](#) they supported.

The pilot project off the Mendocino County coast is one of many initiatives California is testing to save such leafy marine ecosystems, which are declining worldwide due to climate change.

Kelp forests play an integral role in the health of the world's oceans, one of the issues being discussed at the United Nations climate summit in Dubai.



Scientific diver Ian Norton checks a chart as he surveys a bull kelp reforestation project, Friday, Sept. 29, 2023, near Caspar, Calif. California's coast has bull and giant kelp, the world's largest marine algae. Urchins have hurt both species, though giant kelp forests have fared better. Credit: AP Photo/Gregory Bull

Based on early observations, efforts like urchin culling appear to be helping.

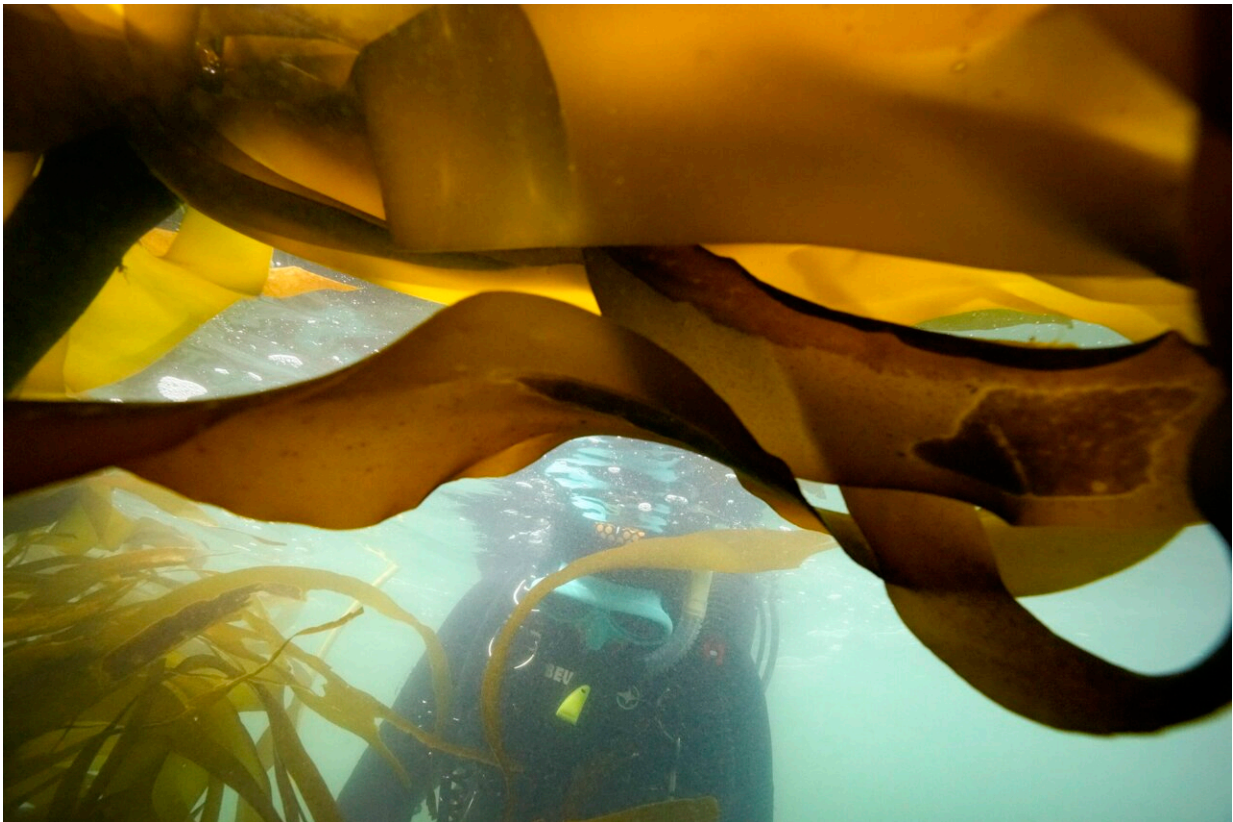
Biologists say they have started to see small successes with the experiments started several years ago, offering hope of reversing destruction likened to a rainforest being clear-cut.

Healthy patches of kelp and schools of fish returned this summer to small sections where urchins were crushed at Caspar Cove, 160 miles

(200 kilometers) north of San Francisco.

Nearby at Albion Bay, where commercial divers removed many of the urchins in 2021, biologists put tiny kelp grown in a lab on 98-foot (30-meter) lines. In August, they discovered the kelp not only had reached the surface, but was reproducing.

"That's the first time we know of that happening in an open coastal environment," said Norah Eddy of The Nature Conservancy, one of several organizations participating in the experiment. "What we want is for the kelp to start putting out babies. This is showing these methods can be done in these kinds of rugged environments."



Scientific diver Morgan Murphy-Cannella swims past bull kelp as she surveys a reforestation project, Friday, Sept. 29, 2023, near Caspar, Calif. Kelp forests

play an integral role in the health of the world's oceans, one of the issues being discussed at the United Nations climate summit in Dubai. Credit: AP Photo/Gregory Bull

There are still huge challenges to overcome before California's bull kelp is on the path to recovery. But scientists say the progress has relieved fears the forests were lost forever.

"This is really setting the system up to hold on to the kelp that we do have until we're in a better place," said Kristen Elsmore, a senior scientist at the California Department of Fish and Wildlife.

Scientists will be collecting data over the next three years to determine what methods are most effective as California builds its first plan to restore and manage kelp.

Kelp was so abundant that the state managed it solely as a fishery, overseeing commercial and recreational harvests. Under the plan, kelp will be managed now as an ecosystem, reflecting the heightened understanding of kelp's importance.

"Kelp forms whole forests that are supporting so many other species and so it just has this cascading effect on the near-shore ecosystem when you lose your kelp," Elsmore said. "You're losing a whole forest, not just one species."





Joy Hollenback holds the hammer she uses to crush urchins, Saturday, Sept. 30, 2023, near Caspar, Calif. Hollenback is part of a crew of volunteers who swim, snorkel and dive armed with pick axes and hammers on a sole mission: To crush purple urchins that largely destroyed 96% of California's iconic bull kelp forests between 2014 and 2020, and with it harmed red abalone and other sea life they supported. Credit: AP Photo/Gregory Bull

The plan could inform restoration efforts from Australia to Chile, where kelp faces similar threats.

"The ultimate goal is for these systems to really be self-sustaining and the restoration part to really just be giving it a gentle nudge in the right direction," the scientist said.

Kelp has been disappearing as a warming planet raises ocean temperatures.

Along the West Coast, the problem started after 2013 when a warm water mass nicknamed "the blob" developed off Alaska and stretched south, lingering for four years as it wreaked havoc on marine ecosystems all the way to Mexico's Baja California peninsula.

At the same time, a mysterious wasting disease decimated sunflower sea stars, causing their arms to fall off and turning them into gooey masses, killing 90% of the population.

The star fish is the main purple urchin predator. After the disease killed more than 5 billion sea stars, the urchin population exploded, devouring kelp and leaving seascapes with almost nothing but the spiny, globular echinoderms.



In this image provided by The Nature Conservancy, Josh Russo smashes urchins Sunday, Sept. 22, 2019, at Van Damme State Beach, near Caspar, Calif. From urchin crushing to lab-grown kelp, efforts to save California's kelp forests show promise. Credit: Ralph Pace/The Nature Conservancy via AP

The kelp loss prompted the California Fish and Game Commission to close its recreational red abalone fishery in 2018. Commercial harvests of red urchins have also been hurt. Red urchins are favored over the purple urchins because they contain more edible uni or roe inside, but commercial divers say the amount has shrunk with less kelp.

Bull kelp, an annual seaweed, starts as a microscopic spore that grows up to two feet (.6 meters) per day until it reaches up to 98 feet (30 meters) before dying off in the cooler months. It flourishes in cool, nutrient-rich



waters.

California's coast has bull and giant kelp, the world's largest marine algae. Urchins have hurt both species, though giant kelp forests have fared better.

Some believe the only way to restore kelp is to reduce the purple urchins, which can go dormant for years only to remerge and eat new kelp growth. Chefs have started serving purple urchins to build a market.



Artist Margaret Seelie holds an urchin during an event to remove them with the hope of restoring kelp forests, Saturday, Sept. 30, 2023, near Caspar, Calif. Urchins have hurt both giant and bull kelp, though giant kelp forests have fared better. Credit: AP Photo/Gregory Bull

"Sometime it does feel weird, like you're killing this animal that's a native species, but it's for the greater good," said Morgan Murphy-Cannella of Reef Check Foundation, the kelp restoration coordinator involved in the [kelp](#) planting at Albion Bay. Its volunteers monitor [kelp forests](#) from Canada to Mexico.

Josh Russo, a former abalone fisher and founder of the Watermen's Alliance, a coalition of spearfishing clubs, helped start the urchin crushing.

The first group was mostly local divers armed with sledgehammers, Russo said, laughing. After struggling to swing them underwater, they turned to small welding and furniture hammers and icepicks.

Volunteers have cleared 80% of purple urchins from a section at Caspar's Cove, Russo said. It is one of two spots where California allows recreational licensed fishers to take an unlimited amount of purple urchins.



Scientific diver Morgan Murphy-Cannella carries her gear after surveying a bull kelp reforestation project, Friday, Sept. 29, 2023, in near Caspar, Calif. California's coast has bull and giant kelp, the world's largest marine algae. Urchins have hurt both species, though giant kelp forests have fared better. Credit: AP Photo/Gregory Bull

But the urchin crushing is not without controversy. Some fear it could spread urchin eggs, exacerbating the problem.

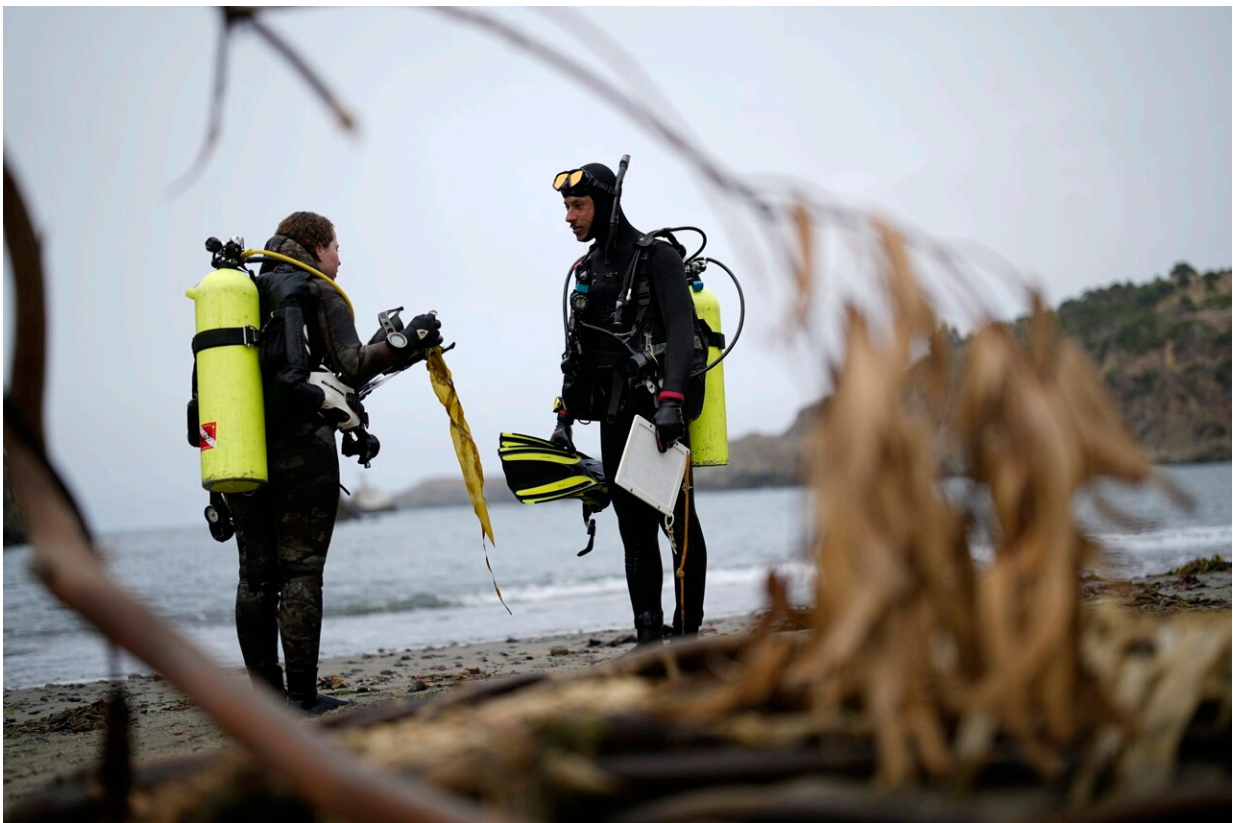
Russo's seen no evidence of that. Instead, he said, the density of urchins has lessened in the 100-by-100 yard (91 by 91 meter) section, where schools of juvenile rock fish swished this summer amid the towering algae.

"This went from being urchin barren to just full of life again," Russo said.

Scientists say nothing can replace natural predators, like the sunflower sea star.

After learning to breed it in captivity, biologists are building a stock to reintroduce it. Sunflower sea stars are at four California aquariums, including the Birch aquarium in San Diego that induced the spawning of three in October.

At least four sunflower star fish also were spotted off the Mendocino coast this year, which Elsmore said "is super exciting" since none were seen for years there.





Scientific divers Rachael Karm, left, and Vini Souza talk on the beach after surveying a bull kelp reforestation project, Friday, Sept. 29, 2023, near Caspar, Calif. Kelp forests play an integral role in the health of the world's oceans, one of the issues being discussed at the United Nations climate summit in Dubai.  
Credit: AP Photo/Gregory Bull



Scientific diver Rachael Karm holds bull kelp with a dark patch of reproductive spores as she surveys a reforestation project, Friday, Sept. 29, 2023, near Caspar, Calif. Kelp forests play an integral role in the health of the world's oceans, one of the issues being discussed at the United Nations climate summit in Dubai.  
Credit: AP Photo/Gregory Bull





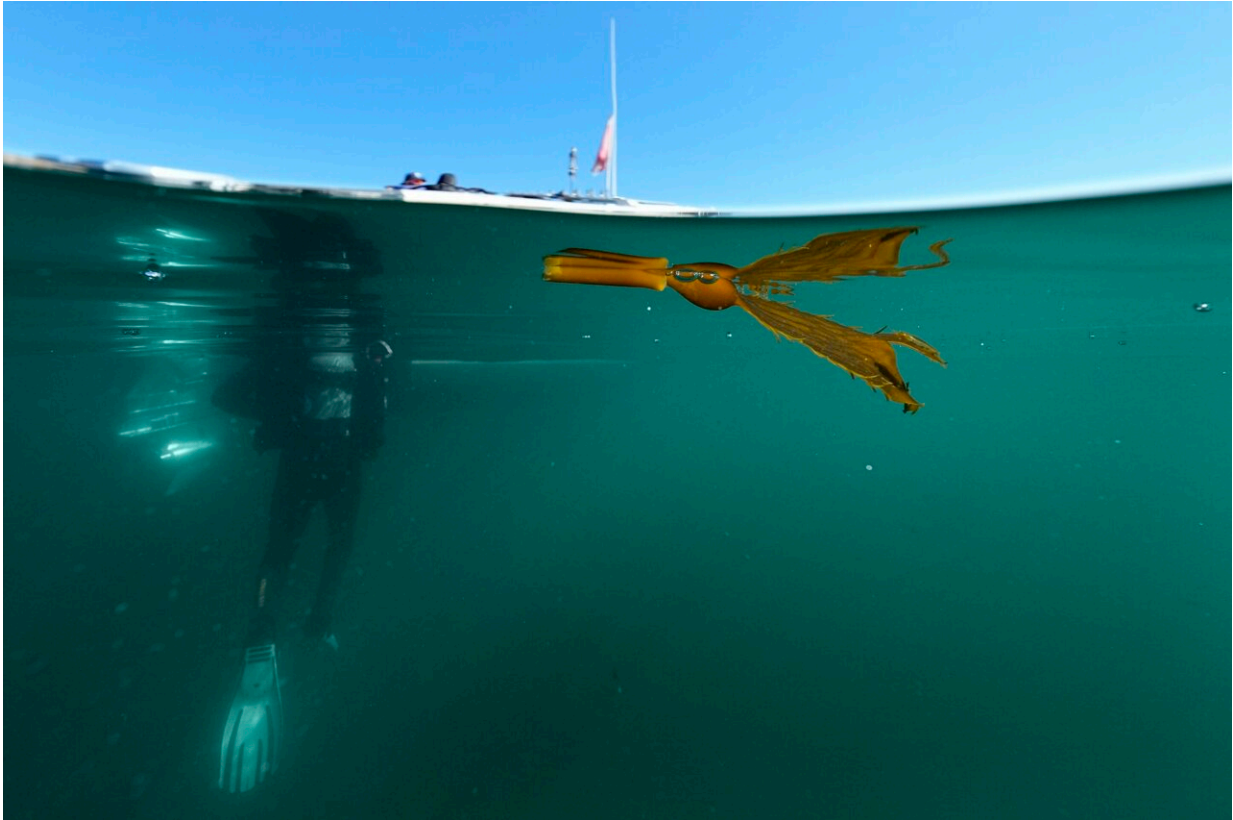
Artist Margaret Seelie, right, smiles as she loads urchins into her kayak, caught by Keevan Harding, left, during an event to remove urchins with the hope of restoring kelp forests, Saturday, Sept. 30, 2023, near Caspar, Calif. Seelie uses the colorful urchins for various elements in her artwork, including as dye for clothing. Credit: AP Photo/Gregory Bull



Scientific diver Ryan Yee checks a gauge as he descends to remove urchins at a project site by the Bay Foundation off the Palos Verdes Peninsula, Tuesday, Nov. 28, 2023, near Rancho Palos Verdes, Calif. Once a vast kelp forest, the area is now largely barren, overrun by urchins. The Foundation's Kelp Forest Restoration Project aims to remove much of the urchins in the hope of bringing back the kelp forests. Credit: AP Photo/Gregory Bull



Keevan Harding places urchins in a net bag during an event to remove them with the hope of restoring kelp forests, Saturday, Sept. 30, 2023, near Caspar, Calif.  
Credit: AP Photo/Gregory Bull



One small section of kelp floats on the surface as scientific diver Ryan Yee, below left, waits to climb back into the boat after culling urchins at a project site by the Bay Foundation off the Palos Verdes Peninsula, Tuesday, Nov. 28, 2023, near Rancho Palos Verdes, Calif. Once a vast kelp forest, the area is now largely barren, overrun by urchins. The Foundation's Kelp Forest Restoration Project aims to remove much of the urchins in the hope of bringing back the kelp forests. Credit: AP Photo/Gregory Bull





Decomposing urchins sit in a bin, Saturday, Sept. 30, 2023, in Fort Bragg, Calif. Urchins have hurt both giant and bull kelp, though giant kelp forests have fared better. Credit: AP Photo/Gregory Bull





In this image provided by The Nature Conservancy, sunflower sea stars are visible in a tank Friday, July 9, 2021, in Friday Harbor, Wash. The star fish is the main purple urchin predator. Credit: Ralph Pace/The Nature Conservancy via AP



A diver waves to a girl as he cleans the glass of the Birch Aquarium's giant kelp forest exhibit, Tuesday, Oct. 10, 2023, in San Diego. The exhibit, complete with moray eels, leopard sharks and sea bass, is designed to give visitors a sense of how a healthy kelp forest could look like. Credit: AP Photo/Gregory Bull





Divers remove their gear after culling urchins as a strand of kelp floats past at a project site by the Bay Foundation off the Palos Verdes Peninsula, Tuesday, Nov. 28, 2023, near Rancho Palos Verdes, Calif. Once a vast kelp forest, the area is now largely barren, overrun by urchins. The Foundation's Kelp Forest Restoration Project aims to remove much of the urchins in the hope of bringing back the kelp forests. Credit: AP Photo/Gregory Bull



Bull kelp lines the beach, washing ashore after days of large surf Saturday, Sept. 30, 2023, in a bay near Caspar, Calif. California's coast has bull and giant kelp, the world's largest marine algae. Urchins have hurt both species, though giant kelp forests have fared better. Credit: AP Photo/Gregory Bull



Keevan Harding dives down in search of urchins during an event to remove them with the hope of restoring kelp forests, Saturday, Sept. 30, 2023, near Caspar, Calif. Credit: AP Photo/Gregory Bull

There's still much to learn. Kelp has not come back in all spots cleared of urchins, and scientists don't know why.

But the crushing is helping buy time to find permanent solutions.

Events run April to September and draw people from across Northern California.

On a Saturday in September, volunteers included a paralegal, a factory worker, university students and a landscape contractor whose two



Australian shepherds, "Swimmer" and "Breaker," watched patiently from the beach. One artist collected the urchins to make purple dye for clothing.

Hollenback, the veterinarian, started participating in May 2022 after seeing the events on Facebook. She has hammered as many as 82 urchins in the 50 seconds she can hold her breath. On this day the sea was too turbulent at Caspar Cove so the group diverted to a neighboring bay to seek urchins.

"It can feel counterintuitive to kill animals when my job is to save them," she said. "But this is helping to save the entire ecosystem."

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