Terry Kerby has been piloting deep-sea submarines for four decades, but nothing prepared him for the devastation he observed recently on several underwater mountains called seamounts in the middle of the Pacific Ocean.

"It was a biological desert," he said. Where normally fish and crabs dart about forests of coral and sponges, "all we could can see was a parking lot full of nets and lines, with no life at all."

Kerby and Brendan Roark, a geographer at Texas A&M University, are comparing seamounts that have been fished with those in pristine, protected areas. This month they surveyed the upper reaches of four seamounts, one of which, Hancock, lies inside Papahanaumokuakea Marine National Monument, which includes the Northwestern Hawaiian Islands.

They knew that the seamounts had been fished by trawlers and coral harvesters at some point, "but the extent of the devastation and the huge amount of gear that was abandoned on the bottom were shocking for both of us," he said.

Among the casualties littering the seabed were 10-foot-tall black corals that can live over 4,000 years, among the oldest forms of life on Earth.

"Allowing fishing in the few protected seamounts left would be a huge mistake," Roark said.

It's a sentiment widely shared among marine ecologists.

The Trump administration is considering rolling back federal protections for 10 national monuments, including two in the Central Pacific. The Pacific Remote Islands National Marine Monument and the Rose Atoll National Marine Monument protect the waters around a handful of islands, most uninhabited, to the south of the Hawaiian Islands.

The shore reefs of the islands have long been protected from commercial fishing; the monument designations extended that protection to 50 miles from shore in some cases and 200 miles in others.

According to a memo obtained in September by The Washington Post, Interior Secretary Ryan Zinke has recommended that the designations of the Pacific Remote Islands and the Rose Atoll be amended "to allow commercial fishing." (A similar recommendation was made for another marine monument, the Northeast Canyons and Seamounts, off the coast of New England.)

The memo did not mention the largest marine reserve: Papahanaumokuakea, a string of mostly uninhabited atolls and reefs that have been largely undisturbed since World War II. At about 583,000 square miles, it is the largest protected area on the planet. (Industry officials in Hawaii are pressing for commercial fishing to be allowed there, too.)

Many scientists see these marine reserves as among the last rich, untouched ecosystems where they can study the effects of climate change in isolation from the impacts of overfishing or pollution.

'A fake protection'

The fishing industry here in Hawaii sees it differently. A driving force behind the administration's reconsideration is an obscure but powerful quasi-governmental organization called the Western Pacific Fishery Management Council, or Wespac, based in Honolulu. The council has jurisdiction over the waters where 140 longline vessels based in Hawaii — as well as a handful in American Samoa — fish mostly for tuna and billfish.

Ray Hilborn, a fisheries expert at the University of Washington and a scientific adviser to Wespac, argues that tuna and billfish are highly migratory and travel in and out of the reserves. "The monuments just force the fishermen to go farther and spend more fuel to catch the same fish," he said. "It's a fake protection."

Asked whether Wespac sought to reintroduce fishing only in monument waters or also in near-shore reefs, Kitty Simonds, the longtime executive director, said in an email that the council also would review "the management measures that were in place before the monument designation and may recommend changes."

The fishing industry in Hawaii is hardly in trouble, several experts noted. Indeed, the Hawaii fleet's bigeye tuna catch has doubled since 2006, even though half of America's Pacific waters are now off-limits to fishing.

Robert Richmond, a marine ecologist at the University of Hawaii, pointed out that the Hawaii fleet filled its yearly quota of bigeye in August this year, "so they obviously don't need more space to fish. They're just against all protected areas on principle."

Over 500 million people depend on reefs for protein, Richmond said, and they already yield far less than they could if they were sustainably fished. Reef ecosystems could become even less productive as the ocean gets warmer and more acidic.

Richmond and other scientists also took issue with Hilborn's criticism of marine monuments. They say the reserves serve as havens for species depleted elsewhere and for populations migrating away from the equator, where warming waters are lowering plankton density.

Restoring populations

"The fisheries benefits of marine reserves are now beyond doubt," Callum Roberts, a marine conservation biologist at the University of York, said in an email. "They allow fish populations to grow back and spill fish into surrounding waters, they pour fountains of offspring into ocean currents that seed fisheries, and they provide resilience to environmental shocks."

The tools favored by fisheries officials target a few species to the neglect of others, he added, while "reserve benefits reach entire ecosystems."

So interconnected are the elements of intact reef communities that allowing fishing just beyond 12 miles would disrupt the ecosystem, said Alan Friedlander, a marine ecologist at the University of Hawaii and chief scientist of the National Geographic Society's Pristine Seas project.

"You need to keep the fishing as far away as possible, ideally at 200 miles," Friedlander said.

Moreover, the remote locations are difficult to police. Many of the denizens of intact tropical reefs, like humphead parrotfish and wrasses, are worth thousands of dollars in Asia, Richmond said.

"Fishing them sustainably, as Wespac proposes, would mean traveling very long distances from Hawaii and taking very few fish," he said. "It wouldn't be economical." Richmond predicted that fishing vessels "would poach the heck out of those islands."

"The only thing standing between these fleets and global depletion are these big no-take reserves," said Daniel Pauly, a prominent fisheries scientist at the University of British Columbia. "So this is the time to create more, not to open up the existing ones to fishing."

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