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UCSB Teams With Greenpeace and NOAA to Study World's Largest Undersea Canyons

A research collaboration involving UC Santa Barbara, Greenpeace, and the National Oceanographic and Atmospheric Administration (NOAA) has documented abundant corals in the world's largest underwater canyons in Alaska's Bering Sea, and demonstrated their use as a habitat for fish.

It also identified several long-lived coral species not previously thought to exist in the Bering Sea, and yielded the discovery of an entirely new sponge, which was given the name Aaptos kanuux –– the Aleut word for heart –– symbolizing a view of the canyons as the heart of the Bering Sea. The findings appear today in PLoS ONE, a scientific journal published by the Public Library of Science.

The research also found evidence of disturbance to seafloor habitats and damage to corals from ongoing fishing activities. NOAA's National Marine Fisheries Service estimated that 82 metric tons of coral are removed from the sea floor off Alaska each year by commercial fishing.

"Although it's becoming more common for scientists and fishery managers to work with fishermen and other stakeholders, collaborations with environmentalists are rare," said Robert Miller, a research biologist at UCSB and the paper's lead author.

Researchers surveyed the sea floor in the enormous and virtually unexplored Bering Sea Canyons using DeepWorker submersibles –– small, single-pilot submarines equipped with high-definition video cameras –– powerful lights, indexing lasers, and robotic sampling arms that allowed scientists to document the rich habitat and diverse marine life thriving in the canyon depths.

Using computer software and algorithms developed by UCSB's Center for Bio-image Informatics, more than 3,200 video frames from 16 dives were analyzed. The research findings provide evidence of higher densities of coral in the canyons than in most areas surveyed in the North Pacific outside the Aleutian Archipelago, and, notably, illustrate coral's important role as habitat for commercially valuable fishes in some of America's most productive fishing grounds.

"This study shows that fishes associated with corals as much as they did with other forms of structure, such as boulders," said Miller. "In the deep sea, larger physical structures like corals are rare, and corals can be very important in providing a more complex habitat that supports more species than flat bottom."

Nutrient-rich currents flow from the canyon depths up to the continental shelf, fueling phytoplankton blooms that support a multitude of marine life, including marine mammals and seabirds, Miller noted. The slow-growing corals and sponges on the bottom likely depend on this phytoplankton for food.

"This study provided much-needed information on deep-sea coral and sponge habitat in the one area of Alaska where we had virtually no observations," said Bob Stone, a biologist with NOAA's Auke Bay Lab. "Contrary to expectations based on available evidence, the canyons do support areas of coral habitat that deserve attention, especially given the apparent lack of otherwise structured habitat in the canyons and the fact that these are the most northerly known coral assemblages of their kind in the North Pacific."

"This research has huge implications for the future of the canyons and for fisheries," said John Hocevar, Greenpeace Oceans Campaigner and the paper's second lead author. "The world's largest underwater canyons need a measure of protection from the world's largest fishery, and, hopefully, what we've learned using the world's smallest submarines will help get it done."

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† Middle photo: Pacific ocean perch (Sebastes alutus) with the gorgonian coral Plumarella sp. at a depth of 230m in Pribilof Canyon in the Bering Sea. Pacific ocean perch are a major fishery species in the Bering Sea.

Credit: Greenpeace/John Hocevar.

†† Bottom photo: Gorgonian coral Plumarella sp. next to pom-pom anemone Liponema brevicornis at a depth of approximately 200 meters in Pribilof Canyon in the Bering Sea.

Credit: Greenpeace/John Hocevar

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