

Scientists discover additional healthy deep-sea coral reefs and new seamounts in the Galápagos

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An area of biodiversity (including corals, crustaceans, urchins, anemones, and more) on Cacho De Coral, a newly discovered pristine coral reef. The dive investigated the volcanic plug of the caldera, then transited over steep terrain to examine the extent of the reef and the corals that live there. Dive 577 was at to Cacho De Coral in the Galápagos Marine Reserve, a pristine coral reef newly discovered by R/V Atlantis and HOV Alvin. Credit: Schmidt Ocean Institute

Scientists examining underwater cliff ecosystems onboard research vessel Falkor (too) using the 4,500 meter robot, ROV SuBastian, have discovered two pristine coral reefs in the waters surrounding the Galápagos Islands. These newly identified cold-water reefs are situated at depths ranging from 370 to 420 meters.

The discovery expands understanding of deep reefs within the Galápagos Islands Marine Reserve and included the participation of Woods Hole Oceanographic Institution (WHOI) [marine biologist](#) and deep-sea ecologist Tim Shank and seafloor geologist and geophysicist Dan Fornari.

The larger of the two reefs spans over 800 meters in length, the equivalent of eight football fields. The second, smaller reef measures 250 meters in length. They exhibit a rich diversity of stony coral species, suggesting that they have likely been forming and supporting marine biodiversity for thousands of years.

This discovery follows the April 2023 finding of the [first deep coral reefs in the Galápagos](#) Marine Reserve by scientists onboard Woods Hole Oceanographic Institution's R/V Atlantis diving in the human-occupied submersible Alvin.

"What we saw may very well be just the tip of the iceberg," said Shank. "There could easily be more reef habitat on the seafloor off the Galápagos than the 800-meter feature we found. It speaks to the need for more work to be done to fully map and understand the importance of special this place."

One goal of the expedition was to apply laser scanning technology for creating extremely high-resolution maps of these reefs. The laser scanner produced two-millimeter resolution maps capable of identifying animals living on the seafloor. Because of the coarse resolution, most underwater

mapping technology cannot image living organisms.

In addition to discovering the reefs, scientists uncovered two uncharted seamounts and mapped them to a high resolution. The seamounts were suspected to exist based on [satellite data](#) and are now confirmed.



Remotely operated vehicle (ROV) SuBastian is recovered in the Galapagos Marine Reserve on Research Vessel Falkor (too). The recent expedition discovered two pristine cold-water coral reefs, situated at depths ranging from 370 to 420 meters. Credit: Schmidt Ocean Institute

"This information is not only valuable from a scientific perspective, but it also provides a solid foundation for decision-making that effectively

protects these ecosystems, safeguarding the [biological diversity](#) they harbor and ensuring their resilience in a constantly changing environment. The geological dynamics of the region play a fundamental role in the deep-sea ecosystems. Research and mapping are essential tools to ensure that the Galápagos continue to be an iconic example of the beauty and importance of nature," stated Danny Rueda Córdova, director of the Galápagos National Park Directorate.

The 30-day expedition began on 18 September 2023 and was led by Dr. Katleen Robert of the Fisheries and Marine Institute of Memorial University of Newfoundland and Labrador.

The expedition included 24 participating scientists representing 13 organizations and universities including the Galápagos National Park Directorate (GNPD), Charles Darwin Foundation (CDF), the Ecuadorian Navy's Oceanographic and Antarctic Institute (INOCAR), National Geographic Society, Monterey Bay Aquarium Research Institute (MBARI), University of Bristol, Woods Hole Oceanographic Institution (WHOI), University of Costa Rica, the UK National Oceanography Centre, Institut de Ciències del Mar in Barcelona, Spain, and the University of East Anglia-UK.

"We are thrilled our mapping data are able to improve our understanding of reef ecosystems in the Galápagos," said Robert, "The interdisciplinary science team is excited that the data collected during this expedition will contribute to growing knowledge on the Galápagos National Marine Reserve and contribute to the management of the Eastern Tropical Pacific Marine Corridor."

In addition to investigating coral biodiversity in the Galápagos, the scientists explored areas within the Isla del Coco National Marine Park, a protected area managed by Costa Rica. The team, led by National Geographic Explorer Ana Belen Yanez, explored seamounts south-west

of Isla del Coco and examined links between coral communities on seamounts in the Galápagos and those in Costa Rica.

On one of the ROV dives, the researchers observed multiple deep-sea coral species laden with eggs. This research contributes data to inform the management of the Eastern Tropical Pacific Marine Corridor, a network of interconnected marine reserves managed by the governments of Ecuador, Costa Rica, Panama, and Colombia.

"The Galápagos Marine Reserve is an area of outstanding biological importance, connected to partner marine protected areas across the Eastern Pacific. Finding such deep and long-lived [reef](#) takes us important steps closer to protecting hidden dimensions of ocean diversity and understanding the role that deep habitats play in maintaining our ocean's health," said CDF's Stuart Banks. "These fascinating new findings continue to feed important research to inform better management of existing and future marine protected areas in the region."

"The Galápagos and Costa Rica Marine Reserves are globally renowned for their pristine beauty and Schmidt Ocean Institute is honored to be operating several expeditions in this part of the world," said Jyotika Virmani, executive director of Schmidt Ocean Institute. "This is our second of three expeditions, and it is amazing that the scientists who sail on R/V Falkor (too) continue to find hotbeds of biodiversity each time we send ROV SuBastian down to the seafloor."

Provided by Woods Hole Oceanographic Institution

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